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Protokol odprte polnilne točke (OCPP) (Hitri postopek)

Open Charge Point Protocol (OCPP) (Fast track)

Ta slovenski standard je istoveten z: prEN IEC 63584:2024

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69/964/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

| | |
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| PROJECT NUMBER: IEC 63584 ED1 | |
| DATE OF CIRCULATION: 2024-07-26 | CLOSING DATE FOR VOTING: 2024-10-18 |
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| IEC TC 69 : ELECTRICAL POWER/ENERGY TRANSFER SYSTEMS FOR ELECTRICALLY PROPELLED ROAD VEHICLES AND INDUSTRIAL TRUCKS | |
| SECRETARIAT: Belgium | SECRETARY: Mr Peter Van den Bossche |
| OF INTEREST TO THE FOLLOWING COMMITTEES: TC 57 | PROPOSED HORIZONTAL STANDARD: <input type="checkbox"/> Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary. |
| FUNCTIONS CONCERNED: <input type="checkbox"/> EMC <input type="checkbox"/> ENVIRONMENT <input type="checkbox"/> QUALITY ASSURANCE <input type="checkbox"/> SAFETY | |
| <input checked="" type="checkbox"/> SUBMITTED FOR CENELEC PARALLEL VOTING Attention IEC-CENELEC parallel voting The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system. | <input type="checkbox"/> NOT SUBMITTED FOR CENELEC PARALLEL VOTING |

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|--|
| TITLE: Open Charge Point Protocol (OCP) (Fast track) |
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PROPOSED STABILITY DATE: 2027

NOTE FROM TC/SC OFFICERS:

This present document is the OCPP proposal submitted by the Open Charge Alliance (OCA). As announced in the RQ document (69/926/RQ) circulated on the 1st December 2023, the Open Charge Alliance (OCA) was approved as a liaison A organisation for IEC TC 69. As entitled according to the ISO/IEC Directives Annex F a liaison A organisation has the right to submit a document for fast-track adoption which is then circulated as a CDV, following the IEC procedures.

The information document (69/963/INF) was circulated on the 7 June 2024 which provides further information regarding the approach adopted.

~~Note that CENELEC has decided not to use the Frankfurt agreement for this OCA submission under the fast track procedure.~~

Please note that CENELEC has decided to submit this CDV for parallel voting.

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OCPP 2.0.1
Part 0 - Introduction

Edition 3 FINAL, 2024-05-06

Table of Contents

| | |
|--|----|
| Disclaimer | 1 |
| Version History | 2 |
| 1. Introduction | 3 |
| 1.1. OCPP version 2.0.1 | 3 |
| 1.2. Terms and abbreviations | 3 |
| 1.3. References | 4 |
| 2. New functionalities in OCPP2.0.1 | 5 |
| 2.1. Device Management | 5 |
| 2.2. Improvements for better handling of large amounts of transactions | 5 |
| 2.3. Improvements regarding cyber security | 5 |
| 2.4. Extended Smart Charging | 5 |
| 2.5. Support for ISO 15118 | 6 |
| 2.6. Improvements for customer experience | 6 |
| 2.7. Transport Protocols: OCPP-J Improvements | 6 |
| 2.8. Minor changes/extensions | 7 |
| 3. OCPP 2.0.1 Documentation Structure | 8 |
| 3.1. Overview of Specification Parts | 8 |
| 3.2. Functional Blocks | 9 |
| 3.3. All Functional Blocks and use cases | 10 |
| 4. Basic implementation of OCPP 2.0.1 | 13 |

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Version History

| Version | Date | Description |
|-----------------|------------|---|
| 2.0.1 Edition 3 | 2024-05-06 | OCPP 2.0.1 Edition 3. All errata from OCPP 2.0.1 Part 0 until and including Errata 2024-04 have been merged into this version of the specification. |
| 2.0.1 | 2020-03-31 | Final version of OCPP 2.0.1 |
| 2.0 | 2018-04-11 | OCPP 2.0 April 2018 First release of this Introduction document |

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1. Introduction

Electric Vehicles (EVs) are becoming the new standard for mobility all over the world. This development is only possible with a good coverage of Charging Stations. To advance the roll out of charging infrastructure, open communication standards play a key role: to enable switching from charging network without necessarily replacing all the Charging Stations, to encourage innovation and cost effectiveness and to allow many and diverse players participate in this new industry.

Additionally, the EV charging infrastructure is part of the Smart Grid, a larger and still evolving ecosystem of actors, devices and protocols. In this Smart Grid ecosystem, open communications standards are key enablers for two-way power flows, real time information exchange, demand control and eMobility services.

The Open Charge Point Protocol (OCPP) is the industry-supported de facto standard for communication between a Charging Station and a Charging Station Management System (CSMS) and is designed to accommodate any type of charging technique. OCPP is an open standard with no cost or licensing barriers for adoption.

1.1. OCPP version 2.0.1

This specification defines version 2.0.1 of OCPP.

After the release of OCPP 2.0, some issues were found in OCPP 2.0. Some of these issues could not be fixed issuing errata to the specification text only, as has been done with OCPP 1.6, but required changes to the protocol's machine-readable schema definition files that cannot be backward compatible.

To prevent confusion in the market and possible interoperability issues in the field, OCA has decided to name this version: 2.0.1. OCPP 2.0.1 contains fixes for all the known issues, to date, not only the fixes to the messages.

This version replaces OCPP 2.0. OCA advises implementers of OCPP to no longer implement OCPP 2.0 and only use version 2.0.1 going forward.

Any mentions of "OCPP 2.0" refers to revision 2.0.1 unless specifically stated otherwise.

1.2. Terms and abbreviations

This section contains the terminology and abbreviations that are used throughout this document.

1.2.1. Terms

| Term | Meaning |
|---|---|
| Charging Station | The Charging Station is the physical system where an EV can be charged. A Charging Station has one or more EVSEs. |
| Charging Station Management System (CSMS) | Charging Station Management System: manages Charging Stations and has the information for authorizing Users for using its Charging Stations. |
| Electric Vehicle Supply Equipment (EVSE) | An EVSE is considered as an independently operated and managed part of the Charging Station that can deliver energy to one EV at a time. |
| Energy Management System (EMS) | In this document this is defined as a device that manages the local loads (consumption and production) based on local and/or contractual constraints and/or contractual incentives. It has additional inputs, such as sensors and controls from e.g. PV, battery storage. |

1.2.2. Abbreviations

| Term | Meaning |
|------|------------------------------------|
| CSO | Charging Station Operator |
| CSMS | Charging Station Management System |
| EMS | Energy Management System. |
| EV | Electric Vehicle |
| EVSE | Electric Vehicle Supply Equipment |
| RFID | Radio-Frequency Identification |

1.3. References

Table 1. References

| Reference | Description |
|-------------------|--|
| [IEC61851-1] | IEC 61851-1 2017: EV conductive charging system - Part 1: General requirements. https://webstore.iec.ch/publication/33644 |
| [IEC62559-2:2015] | Definition of the templates for use cases, actor list and requirements list. https://webstore.iec.ch/publication/22349 |
| [ISO15118-1] | ISO 15118-1 specifies terms and definitions, general requirements and use cases as the basis for the other parts of ISO 15118. It provides a general overview and a common understanding of aspects influencing the charge process, payment and load leveling. https://webstore.iec.ch/publication/9272 |
| [OCPP1.5] | http://www.openchargealliance.org/downloads/ |
| [OCPP1.6] | http://www.openchargealliance.org/downloads/ |

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2. New functionalities in OCPP2.0.1

OCPP 2.0.1 introduces new functionalities compared to OCPP 1.6 [OCPP1.6].

Due to improvements and new features, OCPP 2.0.1 is not backward compatible with OCPP 1.6 [OCPP1.6] or OCPP 1.5 [OCPP1.5].

2.1. Device Management

Device Management (also known as Device Model) is a long awaited feature especially welcomed by CSOs who manage a network of (complex) charging stations (from different vendors).

It provides the following functionality:

- Inventory reporting
- Improved error and state reporting
- Improved configuration
- Customizable Monitoring

This all should help CSOs to reduce the costs of operating a Charging Station network.

Charging Station Manufacturers are free to decide themselves how much details about a Charging Station they want to publish via Device Management: for example, they can decide what can be monitored, and what not.

2.2. Improvements for better handling of large amounts of transactions

2.2.1. One message for all transaction related functionalities

With the growing of the EV charging market, the number of Charging Stations and transactions that the CSMS needs to manage also grows. The structure and method for reporting transaction is unified in OCPP 2.0. In OCPP 1.x, the reporting of transaction data is split over the messages StartTransaction, StopTransaction, MeterValue and StatusNotification. With the market progressing towards more enhanced scheduling, a need is born for more sophisticated handling of transaction data. All the StartTransaction, StopTransaction, and transaction related MeterValue and StatusNotification messages are replaced by 'TransactionEvent'. The StatusNotification message still exists, but only for non-transaction related status notifications about connector availability.

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2.2.2. Data reduction

With the introduction of JSON over Websockets in OCPP 1.6 [OCPP1.6] a great reduction of mobile data cost can be achieved. With OCPP 2.0, support for WebSocket Compression is introduced, which reduces the amount of data even more.

2.3. Improvements regarding cyber security

The following improvements have been added to harden OCPP against cyber attacks:

- Security profiles (3 levels) for Charging Station and/or CSMS authentication and Communication Security
- Key management for Client-Side certificates
- Secure firmware updates
- Security event log

2.4. Extended Smart Charging

In OCPP 2.0.1 Smart Charging functionality has been extended (compared to OCPP 1.6 [OCPP1.6]) to support:

- Direct Smart Charging inputs from an Energy Management System (EMS) to a Charging Station
- Improved Smart Charging with a local controller
- Support for integrated smart charging of the CSMS, Charging Station and EV ([ISO15118-1]).

2.5. Support for ISO 15118

The ISO 15118 standard [ISO15118-1] is a newer protocol for EVSE to EV communication, compared to IEC 61851 [IEC61851-1]. ISO 15118 allows a lot of new features and more secure communication between EVSE and EV. OCPP 2.0.1 supports the ISO 15118 standard, the newly added features are:

- Plug & Charge
- Smart Charging including input from the EV

2.6. Improvements for customer experience

2.6.1. More authorization options

OCPP 1.x was designed (mainly) for Charging Stations that authorize an EV driver via an RFID card/token. If other authorization systems or a mix of systems are used, the CSMS needs to know what system is used for which authorization. OCPP 2.0.1 has been extended to support things like: 15118 Plug & Charge [ISO15118-1], Payment Terminals, local mechanical key, Smart-phones, etc.

2.6.2. Display Messages

This provides Charging Station Operators with the possibility to configure - from the CSMS - a message on a Charging Station to be displayed to EV drivers. Messages can be transaction related or global.

2.6.3. EV Driver preferred languages

To be able to show messages to an EV driver in a language the driver understands best, OCPP 2.0.1 provides the possibility to send the language preference of a driver to a Charging Station.

2.6.4. Tariff and Costs

OCPP 2.0.1 allows Charging Stations to show the applicable tariff/price before an EV driver starts charging, to show the running total cost during a charging transaction and/or to show the final total cost after the transaction is finished.

2.7. Transport Protocols: OCPP-J Improvements

2.7.1. Simple Message routing

A description has been added on how to create a simple solution for OCPP message routing in, for example, a Local Controller. This is defined in Part 4, Section 6: OCPP Routing.

2.7.2. No SOAP Support

OCPP 2.0.1 no longer supports SOAP as a transport protocol. This decision was taken by the OCA members, who believe that the protocol does no longer lend itself for constrained computing resources that many Charging Stations operate under. The verbosity of the protocol could lead to slower performance and requires a higher bandwidth, which, in many cases, leads to higher cellular costs. SOAP is also difficult to support when communication is via local site networking.

2.8. Minor changes/extensions

2.8.1. Renamed messages

In the OCPP 1.x series, the names of all messages were kept unchanged for backward compatibility, even though some message names were found to be confusing or misleading in practice. In OCPP 2.0.1 message names have been changed, where appropriate, to improve clarity and understanding.

Example: RemoteStartTransaction.req: a lot of implementers thought it meant the Charging Station should start the transaction, but in fact it is a request to try to start a transaction. However, for example, if no cable is plugged in, no transaction can be started. Since the message was always intended to be a request, it has been changed to a more logical name: RequestStartTransactionRequest.

2.8.2. TransactionId Identification & Message Sequencing

In OCPP 2.0, transaction identifiers are generated by the Charging Station, to facilitate offline charging sessions, in contrast to OCPP 1.x, where transaction identifiers were generated at the CSMS and sent to the Charging Station. In addition, all messages relating to a transaction are assigned incremental sequence numbering, to facilitate transaction data completeness checking at the CSMS.

2.8.3. Extended enumerations

Many enumerations have been extended to support more use cases, provide more options etc.

2.8.4. Offline Transaction Event Indication

Charging Stations can optionally indicate in transaction messages that a transaction event occurred while the Charging Station was Offline. This can assist a CSMS with the processing of transactions.

2.8.5. Personal message

Message that can be shown to the EV Driver and can be used for tariff information, user greetings and for indicating why a driver is not authorized to charge. When a driver uses an authorization method (RFID for example) and the CSMS does not authorize the driver to start charging, this field can thus contain additional reasons to provide the driver with a meaningful explanation why (s)he is not allowed to charge.

3. OCPP 2.0.1 Documentation Structure

3.1. Overview of Specification Parts

The overall structure of the standard has been improved, making the new specification easier to read, implement and test.

For readability and implementation purposes, OCPP 2.0.1 is divided in seven parts.

Table 2. Parts

| | |
|---------------|---|
| Part 0 | Introduction (this document) |
| Part 1 | Architecture & Topology |
| Part 2 | Specification: Use Cases and Requirements, Messages, Data Types and Referenced Components and Variables Appendices: Security Events, Standardized Units of Measure, Components and Variables |
| Part 3 | Schemas |
| Part 4 | Implementation Guide JSON |
| Part 5 | Certification Profiles |
| Part 6 | Test Cases |

In contrast to OCPP 1.6 [OCPP1.6], the OCPP 2.0.1 specification is written in a different structure, based on [IEC62559-2:2015]: "Use case methodology - Part 2: Definition of the template for use cases, actor list and requirements list".

Part 2, the specification, is divided into 'Functional Blocks'. These Functional Blocks contain use cases and requirements. Messages, Data Types and Referenced Components and Variables are described at the end of the document. The Appendices can be found in the separate document: Part 2 - Appendices.

Messages and Data Types are structured in almost the same way as the previous OCPP specification [OCPP1.6].

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